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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,469	12/16/2003	Ramgopal Darolia	13DV-14273	1468

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EXAMINER
BURKHART, ELIZABETH A

ART UNIT	PAPER NUMBER
1792	

MAIL DATE	DELIVERY MODE
10/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/707,469	DAROLIA ET AL.	
	Examiner	Art Unit	
	Elizabeth Burkhart	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20,33 and 34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20,33 and 34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-20, 33, and 34 are pending in this application. Amended claims 1-3, 6-10, 12, 14-17, and 19, cancelled claims 21-32, and new claims 33 and 34 are noted.

The amendment filed 8/16/2007 has been entered and carefully considered.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-20, 33, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rigney et al (US 2002/0172838) in view of Rigney et al ('038).

Rigney et al ('838) discloses a method of depositing a ceramic coating on a substrate wherein the ceramic coating comprises yttrium-stabillized zirconia (YSZ) and a third metal oxide such as lanthana or neodymia in order to reduce the thermal conductivity of the coating [0009]. The ceramic coating is deposited by EBPVD and has a columnar grain structure [0016]. The chamber is backfilled with oxygen. The coating may be deposited by simultaneously evaporating separate ingots of YSZ and metal oxide. Alternatively, the coating may be deposited by evaporating a single ingot containing YSZ and the metal oxide. Also, the coating may be deposited by evaporating an ingot of YSZ and evaporating a metal source so that the metal source is oxidized in the presence of oxygen to form the third metal oxide [0024].

Rigney et al ('838) does not disclose using a carbide compound as a source for the third metal oxide or that the ceramic coating also comprises carbon, a carbon-containing gas, and/or precipitates of the carbide compound.

Rigney et al ('038) discloses a method of depositing a ceramic coating on a substrate wherein the ceramic coating comprises YSZ and carbide-based precipitates. The coating is deposited by EBPVD and the chamber is backfilled with oxygen. The coating may be deposited by evaporating a single ingot containing YSZ and a carbide (Col. 5, lines 23-60). The carbide-based precipitates allow thinner thermal barrier coatings to be used, which reduces processing and material costs (Col. 3, lines 28-31).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to use the carbide compound as suggested by Rigney et al ('038) as the source of the metal oxide of Rigney et al ('838) in order to produce carbide-based precipitates into the thermal barrier coating, which would allow thinner coatings to be used and would reduce processing and material costs.

Regarding Claims 3 and 12, it would have been obvious to use a carbide compound such as LaC_2 and NdC_2 in order to form the metal oxide such as lanthana and neodymia as suggested by Rigney et al ('838).

Regarding Claims 9-12, 18, and 19, it would have been obvious that a carbon-containing gas such as carbon dioxide or carbon monoxide would also be present in said thermal barrier coating because the oxidation of the LaC_2 or NdC_2 to produce lanthana or neodymia would produce byproducts such as a carbon-containing gas and/or carbide-based precipitates depending on the amount of oxygen introduced to the chamber.

Thus, claims 1-20, 33 and 34 would have been obvious within the meaning of 35 USC 103 over the combined teachings of Rigney et al ('838) and Rigney et al ('038).

Response to Arguments

3. Applicant's arguments filed 8/16/2007 have been fully considered but they are not persuasive. Applicant argues that the Rigney application and patent do not disclose or suggest evaporating a metal carbide in a manner that dissociates and oxidizes the metal to form and deposit an oxide of the metal.

The Examiner disagrees. The Rigney application discloses depositing a third metal oxide (lanthana, neodymia, etc.) with YSZ in order to reduce the thermal conductivity of the TBC. The metal oxide may be introduced in the form of metal vapor, which in the presence of oxygen oxidizes to deposit the metal oxide with the YSZ [0024]. The Rigney patent discloses depositing carbide-based precipitates with YSZ in order to prevent grain growth and pore redistribution that would increase the thermal conductivity of the TBC (Col. 4, lines 60-65). The Rigney patent also discloses that the ingot material, which is evaporated by electron beam, could contain a carbide (Col. 5, lines 55-60). Thus, it would have been obvious to one of ordinary skill to provide an ingot containing a carbide as suggested by the Rigney patent as the metal source in the Rigney application since the evaporation by electron beam would be sufficient to dissociate the metal from the carbide compound, which would then be oxidized in the presence of oxygen to form the third metal oxide, but the coating would also have the added benefit of containing carbide precipitates that also lower the thermal conductivity of the TBC coating. Since both the application and patent disclose forming a TBC coating containing YSZ using EBPVD, wherein another material is codeposited with the YSZ to lower the thermal conductivity of the TBC coating, it would have been within the

skill of one of ordinary skill in the art to form a TBC coating incorporating both a metal oxide (application) and carbide precipitates (patent) with the YSZ, especially since the Rigney patent discloses that the ingot may contain a carbide.

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Burkhart whose telephone number is (571) 272-6647. The examiner can normally be reached on Monday-Thursday, 7:00 AM-5:30 PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

eab

TIMOTHY MEEKS
SUPERVISORY PATENT EXAMINER